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EXAMINER

FISCHER, JUSTIN R

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 09/912,865

Filing Date: July 25, 2001

Appellant(s): VICTOR THIELEN, GEORGES MARCEL

MAILED
MAR 13 2005
GROUP 1700

John DeLong
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 12, 2004.

(1) Real Party in Interest

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A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Oare (US 5,871,600), as best depicted in Figure 2A, is directed to a runflat tire construction having at least one runflat insert (42,46), wherein said insert is formed of a diene-based rubber composition exhibiting high hardness and low hysteresis (heat

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buildup). The reference further suggests a preferred blend of natural rubber and polybutadiene rubber for the insert composition (Column 16, Lines 41-44).

Vulcuren teaches the inclusion of a crosslinking agent/anti-reversion agent [1,6-bis(N,N'-dibenzylthiocarbamoyldithio)-hexane] in diene-based rubber compositions in order to (a) provide highly reversion stable vulcanizates and (b) increase the retention of a wide variety of properties, including hardness and low hysteresis.

Freeman is directed to a runflat tire construction having a runflat insert, wherein said insert desirably exhibits the properties of high stiffness (modulus/hardness), low heat buildup or hysteresis, and good resistance to heat (high reversion resistance and good ageing). In this instance, the reference evidences the desired properties of runflat insert compositions.

Saneto teaches a runflat tire construction in which the runflat insert is formed of natural rubber (30-45 phr) and synthetic rubber (55-70 phr), such as polybutadiene. The reference evidences the above noted rubber loading as providing suitable runflat reinforcement.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4-6, and 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oare in view of "Vulcuren® Trial Product KA 9188" Brochure (of record) and Freeman (US 5,494,091, of record).

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As best depicted in Figure 2A, Oare is directed to a runflat tire having at least one sidewall insert radially inward of a carcass ply, wherein said sidewall insert is formed of a diene-based rubber composition. In describing the conventional additives of the insert composition, Oare suggests a vulcanization system having sulfur donating vulcanizing agents, particularly sulfur in an amount between 0.5 and 8 phr (Column 18, Lines 10-20). While Oare fails to suggest a vulcanization system including 1,6-bis (N,N'-dibenzylthiocarbamoyldithio)hexane, this compound is recognized in the rubber industry as being a valuable vulcanizing agent (crosslinking agent) when used with sulfur in the curing of a variety of rubber mixtures, including those formed of natural rubber, isoprene rubber, styrene-butadiene rubber, and butadiene rubber, as shown for example by Vulcuren. In particular, Vulcuren suggests that highly reversion-stable vulcanizates are formed by including the claimed additive and further that improved retention of properties, such as modulus, hardness, and heat build up (hysteresis), are realized. These benefits are consistent with those commonly associated with runflat insert compositions (suggests that retention of these properties would also be desired). In describing the runflat composition, Oare describes said composition as having high stiffness (modulus/hardness) and low hysteresis (heat build up) (Column 15, Lines 30-32). Freeman has been additionally applied to further evidence the desired benefits of a runflat insert composition, particularly high stiffness (modulus/hardness), low heat build up or hysteresis, and good resistance to heat (high reversion resistance and good ageing) (Column 5, Lines 20-40). It is emphasized that the benefits detailed by Oare and Freeman are consistent with the benefits imparted by the claimed additive and as

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such, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the claimed additive in the vulcanization system of Oare. As noted above, the combination of references clearly suggest that high modulus and hardness and low hysteresis are desired properties for the runflat insert- one would similarly expect retention of these properties to be a desired property.

It is initially pointed out that Vulcuren discloses the following in regards to the use of the claimed additive:

- Preferred use in diene rubber compounds, such as natural rubber, isoprene rubber, styrene butadiene rubber, and butadiene rubber
- Provides highly reversion stable vulcanizates
- Recommended use in combination with sulfur and accelerators
- Recommended dosage between 0.5 and 3.0 phr
- Provides improved retention of properties (e.g. modulus, strength, hardness, hysteresis)

Each of the above noted details set forth by Vulcuren is satisfied by Oare or is consistent with runflat technology and also meets the limitations of the claimed invention. First, as is common in the tire industry, Oare suggests the runflat composition be formed of diene-based rubbers, such as natural rubber, isoprene rubber, styrene butadiene rubber, and butadiene rubber (Column 16, Lines 25-40). Second, as recognized in the tire industry and further expressly evidenced by Freeman, it is desired for the runflat component to exhibit high reversion resistance or resistance to the negative effects of sulfur breaking down and surfacing over time. Third, the

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runflat component of Oare is a sulfur vulcanizing system in which accelerators, such as thiazoles, are used (Column 18, Lines 11-45). Fourth, the claimed invention requires the claimed additive be used in an amount between 0.5 and 1.5 phr, which is fully incorporated by the range described by Vulcuren. Lastly, as set forth above, the benefits of high modulus, strength, and hardness and low heat build up are recognized as being desirable in a runflat component and one of ordinary skill in the art at the time of the invention would have similarly expected it to be desirable to improve the retention of the same properties.

As to the amount of the claimed additive, Vulcuren suggests the use of said additive in an amount between 0.5 and 3.0 phr when used in combination with sulfur. It is emphasized that Vulcuren teaches that the usual amount of sulfur should be slightly reduced- thus, given the insert of composition of Oare (0.5 to 8.0 phr of sulfur), one of ordinary skill in the art at the time of the invention would have readily appreciated the combination of sulfur in an amount between 1.5 and 6 phr ("slightly reduced" from usual amount) and the above noted additive in an amount between 0.5 and 5.0 phr.

Regarding the amount of filler, Oare describes the use of carbon black in an amount between 30 and 100 phr (Column 17, Lines 37-40).

With respect to claims 4, 8, 11, and 14, Oare describes the use of natural cis 1,4 polyisoprene rubber, isoprene/butadiene rubber, cis 1,4 polybutadiene rubber, and vinyl 1,2 polybutadiene rubbers (Column 16, Lines 26-40). It is noted that one of ordinary skill in the art at the time of the invention would have readily appreciated and expected the polybutadiene rubber of Oare to be syndiotactic, as is common in the tire industry.

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This position was set forth by the examiner in the previous office action and remains unchallenged by applicant. With specific respect to claim 8, this limitation is only required when a rubber coupled with a group IVa metal is selected. It is noted, though, that such a rubber (coupled with metal) is extensively used in the manufacture of sidewall components and one of ordinary skill in the art at the time of the invention would have found it obvious to form the sidewall insert of Oare from a metal-coupled rubber.

Regarding claim 5, Oare suggests the use of several bifunctional sulfur containing organo silane coupling agents in accordance to the limitations of the claimed invention (Column 17, Lines 55-61).

With respect to claim 6, Oare further suggests the filler component contain silica in addition to carbon black, as is well known in the tire industry (Column 17, Lines 51-55).

Regarding claim 12, Figure 2A of Oare depicts a first crescent-shaped, sidewall insert 42 that is disposed axially inward of a carcass ply 38 and a carcass ply 40.

With respect to claim 13, Oare is directed to the use of different cords in the inner and outer carcass plies, wherein a specific embodiment is described in which the inner carcass is formed of high modulus, steel cords and the outer carcass is formed of lower modulus organic fiber cords (Column 3, Lines 5-15).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oare, Vulcuren, and Freeman, and further in view of Saneto.

Oare, in view of Vulcuren and Freeman, suggests a runflat insert composition having 1,6-bis(N,N'-dibenzylthiocarbamoyldithio)hexane in an amount between 0.5 and 3.0 phr when used in combination with sulfur to define the vulcanization system. In describing the insert composition, Oare describes the general use of a mixture of natural rubber and polybutadiene rubber and further a preferred composition having between 60 and 90 phr of natural rubber and between 10 and 40 phr of a synthetic rubber, such as polybutadiene (1,4 and 1,2 are suggested), wherein the 100% modulus is between 5 and 7 MPa. While these ranges (amount of each rubber) are slightly outside of the claimed ranges, Oare is not restricted to this composition, as evidenced by the language "preferred composition". One of ordinary skill in the art at the time of the invention would have readily appreciated additional rubber compositions for the sidewall insert formed of natural rubber and polybutadiene rubber in accordance to the ranges of the claimed invention, such that said composition provides the necessary properties (e.g. 100% modulus) desired for a runflat sidewall insert. For example, Saneto describes a similar runflat tire construction in which a sidewall insert is positioned inside of an innermost carcass ply, in an analogous manner to the claimed invention, and formed of between 30 and 45 phr of natural rubber and between 55 and 70 phr of polybutadiene rubber (Column 3, Lines 13-55). In this instance, such a rubber composition has a 100% modulus between 5.9 MPa and 9.8 MPa, which encompasses nearly the entire range of values disclosed by Oare. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the sidewall insert

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with natural rubber and polybutadiene rubber in accordance to the limitations of the claimed invention, as further set forth below.

Regarding claim 17, Oare further suggests (in the insert composition) that (i) carbon black is included in an amount between 30 and 100 phr and (ii) sulfur is included in amount between 0.5 and 8.0 phr. It is noted that the inclusion of the claimed additive to the vulcanization system of Oare would slightly reduce the amount of sulfur used. Lastly, regarding the sidewall insert composition, Saneto illustrates that rubber compositions having natural rubber and polybutadiene rubber within the claimed ranges are recognized as providing suitable properties to impart a desired degree of runflat operation. Though the polybutadiene component is not expressly disclosed as being formed of both 1,2 and 1,4 polybutadiene, Oare suggests the use of each of the polybutadiene rubbers in the runflat sidewall insert (Column 16, Lines 26-40). It is noted that one of ordinary skill in the art at the time of the invention would have recognized the polybutadiene of Oare as being syndiotactic polybutadiene. Thus, one of ordinary skill in the art at the time of the invention would have readily appreciated a polybutadiene component in the runflat insert of Oare between 50 and 80 phr, in view of Saneto, and furthermore, one of ordinary skill in the art would have readily appreciated the inclusion of both 1,2 and 1,4 polybutadiene to form said polybutadiene component in view of the recognition by Oare that each polybutadiene is a commonly used component in sidewall runflat inserts, there being no evidence of any unexpected results to establish a criticality for the claimed runflat rubber composition, regarding the base rubber composition (absent any additives).

(10) Response to Argument

Applicant initially contends that no motivation exists to combine Oare and Vulcuren. However, as set forth in Page 5, Vulcuren teaches the inclusion of the claimed additive in order to obtain highly reversion stable vulcanizates and increase retention of a wide variety of properties, including hardness and low heat buildup (hysteresis). It is extremely well known that reversion resistance (resistance against breakdown of cross links over time) is desirable in runflat insert compositions, as evidenced by Freeman (Column 5, Lines 20-40). Additionally, Oare recognizes the benefits of high hardness/modulus and low heat buildup as being desirable in runflat insert compositions. While the above noted properties are absolute properties, one of ordinary skill in the art at the time of the invention would have equally desired a high retention of these properties, which results from the inclusion of the claimed additive. Lastly, there is a reasonable expectation of success since Vulcuren is directed to the use of the claimed additive in diene-based rubber formulations, including natural rubber, isoprene rubber, styrene-butadiene rubber, butadiene rubber, and blends thereof- these rubbers are substantially the same as those suggested by Oare (Column 16, Lines 26-35).

In regards to the amount of sulfur and the claimed additive, it is initially pointed out that the diene-based, insert composition of Oare contains sulfur in an amount between 0.5 and 8.0 phr. Following the teachings of Vulcuren, one of ordinary skill in the art at the time of the invention would have included the claimed additive (0.5 to 3.0 phr) in the insert composition of Oare and "slightly reduced" the amount of sulfur. Thus,

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the insert composition of Oare would be expected to contain a maximum amount of sulfur “slightly” below 8.0 phr. The modified sulfur range of Oare, in light of the “slight” reduction, appears to be substantially equal to the broad range of the claimed invention (1.5 phr to 6.0 phr). Furthermore, applicant has not provided a conclusive showing of unexpected results to establish a criticality for the combination of sulfur and the claimed additive in the claimed amounts.

Further regarding the amount of sulfur, applicant contends that Vulcuren teaches that the claimed additive should be used with little or no sulfur. The examiner respectfully disagrees. Vulcuren provides the following two statements: (1) the usual amount of sulfur should be slightly reduced when the claimed additive is used and (2) **when** the claimed additive is used alone (without sulfur), the dosage of said additive should be increased to 7 phr. There is a significant difference in saying that little or no sulfur should be used and saying that the usual amount of sulfur should be reduced. For example, if the usual amount of sulfur is 10 phr, Vulcuren teaches that said amount should be slightly reduced, not entirely eliminated or reduced to a little amount. In Oare, the usual amount of sulfur is between 0.5 and 8.0 phr- upon adding the claimed additive, the amount of sulfur would be slightly reduced and would be expected to fall within the range of the claimed invention. **It is emphasized that nowhere does Vulcuren absolutely teach that little or no sulfur is used with the claimed additive.**

Regarding Figure 1 of Vulcuren, the embodiments describing the amounts of additive and sulfur are exemplary. The critical teaching of Vulcuren is that the “usual amount” of sulfur is slightly reduced when using the claimed additive. The “usual

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amount” of sulfur is not a single sulfur loading but is dependent on the relevant composition. Thus, in modifying a given composition, one of ordinary skill in the art at the time of the invention would determine the “usual amount” of sulfur (for that composition) and modify said amount accordingly. In the case of Oare, the “usual amount” of sulfur is between 0.5 and 8.0 phr. It is evident that a slight reduction in the extreme values of Oare results in a range that is substantially equal to that of the claimed invention and as such, one of ordinary skill in the art at the time of the invention would have found it obvious to include the claimed additive in an amount between 0.5 and 5 phr and sulfur in an amount between 1.5 and 6 phr.

As to Figure A submitted by applicant, the embodiments of Vulcuren are exemplary. In particular, Vulcuren only teaches two embodiments: 0 phr of sulfur and 7 phr of additive and 0.5 phr of sulfur and 2.5 phr of the additive. A fair reading of Vulcuren would not eliminate the use of sulfur concentrations greater than 1 phr as results from the inverse relationship depicted in Figure A. It is emphasized that the teachings of Vulcuren describe a slight reduction in the “usual amount” of sulfur- this is highly dependent on the “usual amount” of sulfur for a given composition (varies from compositions).

In summary, Oare teaches a runflat insert composition comprising a diene-based rubber and a sulfur vulcanizing system, wherein it is well known that properties of high modulus and hardness, high reversion resistance, and low heat buildup are desired. Vulcuren is directed to the inclusion of the claimed additive in diene-based rubber

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compositions having a sulfur vulcanizing system in order to (i) provide highly reversion stable vulcanizates and (ii) improve retention of a wide variety of properties, including hardness, modulus, and low heat buildup. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to include the claimed additive in the runflat insert composition of Oare.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Justin Fischer
March 11, 2005

Conferees



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